PERFORCE

2024
State of Continuous Testing

Explore testing trends from test automation experts

Perfecto BlazeMeter

Welcome to the 2024 State of Continuous Testing Report

In the inaugural edition of the State of Continuous Testing Report, our Perfecto and BlazeMeter experts teamed up to take a deep dive into industry trends—including testing trends, automation rates, the use of AI and ML, and concerns and priorities for 2024.

Perforce surveyed hundreds of leading digital enterprises across a wide range of industries to answer these questions.

Here's what we found, and where continuous testing is going this year.
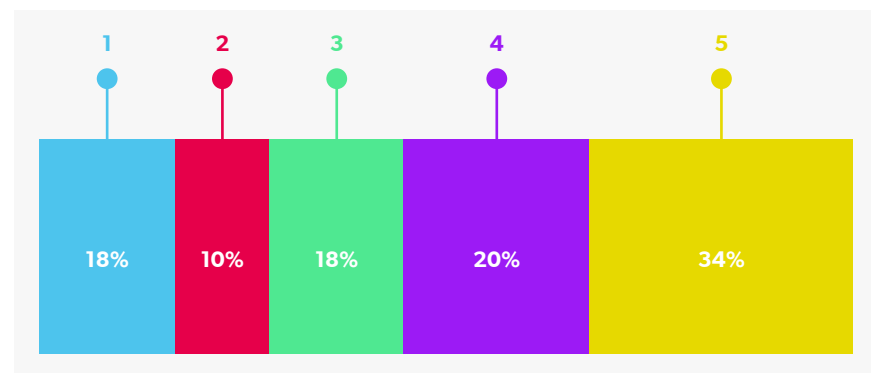
KEY TAKEAWAYS

- **Teams are embracing hybrid cloud testing.**
  To do so, a versatile platform is needed that can effectively support hybrid environments.

- **AI-augmented testing is a huge trend.**
  Teams are looking to incorporate AI into their testing process but only some have currently implemented it.

- **Lack of automation resources challenges teams the most.**
  Teams continue to prioritize automation but lack the resources to fully implement it.

- **Accessibility testing is among the top investment priorities.**
  Alongside performance automation testing, accessibility testing continues to grow in importance.

Mobile Testing Remains Highly Important

Over half of respondents (54%) selected 4 or 5 when asked about the importance of native and mobile web apps to their testing strategy, indicating that testing remains a high priority.

ON A SCALE OF 1 (LOW) TO 5 (HIGH), PLEASE RATE HOW IMPORTANT MOBILE NATIVE AND MOBILE WEB APPS ARE IN YOUR OVERALL TESTING STRATEGY?

1	2	3	4	5
18%	10%	18%	20%	34%

As testing teams look to expand the reach of mobile testing, more use cases must be added to their mobile testing suites. In addition, more types of testing, such as User Experience (UX) testing, are becoming increasingly important.

Perforce's continuous testing suite offers a comprehensive solution for mobile testing challenges, particularly in areas such as UX load testing. The user-centric interface makes advanced testing accessible even to non-technical team members, enhancing usability across complex mobile use cases, including two-factor authentication (2FA), geolocation, voice recognition, network virtualization, and more.

In addition, Perforce is proud to be the first in the industry to offer UX load testing that simulates real-world conditions for your mobile devices. You can test both your mobile user experience and your backend under load in the cloud and scale up to two million virtual users. The solution simulates realistic mobile traffic patterns. You can even generate detailed server and end-user experience reports, which helps teams measure and understand how a mobile app is impacted under a load.

Related Reading: Achieving Continuous Testing With Perforce

The release of Scriptless Mobile also helps teams automate the most complex native mobile use cases through simplified, rapid test creation with as many test combinations as you need to boost your testing efficacy.
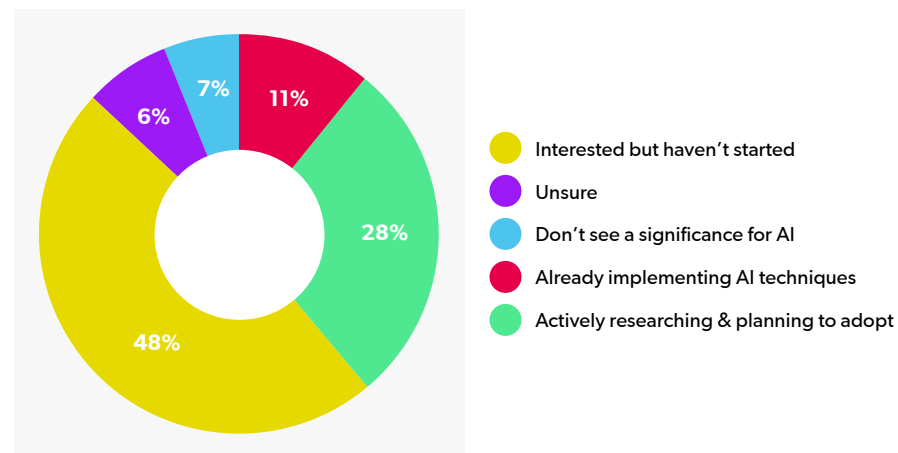
Related Reading: Automated Mobile Testing With Perfecto Scriptless Mobile

Over half of respondents **(54%)** selected 4 or 5 when asked about the importance of native and mobile web apps to their testing strategy.

Interest in AI Testing Surges, But Implementation is Lagging

Artificial Intelligence (AI) and Machine Learning (ML) have been surging in popularity, particularly over the past year. While organizations are hoping to adopt AI and ML to help with the testing process, implementation is still falling short.

HOW DO YOU FORSEE THE ROLE OF AI ENHANCING YOUR TESTING PROCESS IN THE NEAR FUTURE?

- Interested but haven't started
- Unsure
- Don't see a significance for AI
- Already implementing AI techniques
- Actively researching & planning to adopt

While 48% of respondents indicated they are interested in AI but have not yet started any initiatives, only 11% are already implementing AI techniques. The interest is strong, however, with 40% saying they are either already implementing or actively researching and planning to adopt AI—indicating that AI will continue to be a predominate force in testing in 2024.

For many, it feels like AI is the future of testing. AI enables faster and smarter test creation by generating scripts instantly, so teams no longer rely on manual or hybrid coding. AI can also assist by generating reliable test data—which is often a pain point for testers.

Test Data Pro optimizes test data generation, addressing common AI implementation challenges by providing reliable and usable test data, vastly expanded test coverage, increased and reliable accuracy, speed of testing, and bolstered app resilience. This AI-driven data helps solve the problem teams often face of acquiring usable and reliable test data. Test Data Pro assists with security by preventing customers from using real data instead of synthetic data.

Some examples of the type of data Test Data Pro can generate:

- Addresses
- Date and time
- Credit card numbers
- Bank account details
- Seed lists

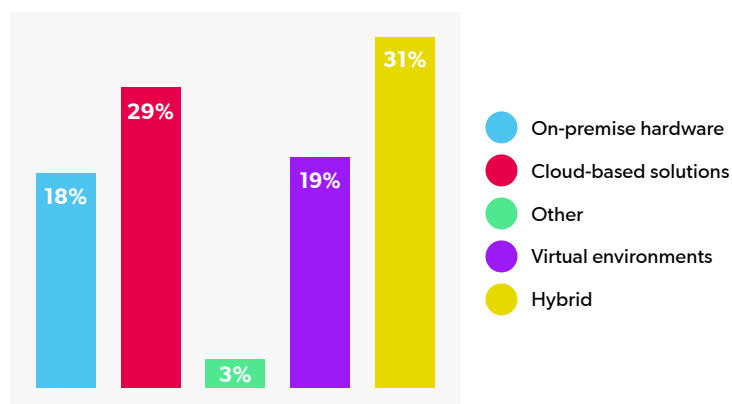**Related Reading:** BlazeMeter Test Data Pro: AI-Driven Test Data Generation & Beyond

Perforce is continually innovating to remain in step with developments in technology and new releases to ensure a seamless testing experience for customers that stays ahead of market trends.

Related Viewing: The Future of Testing: A Conversation About the Use of AI and ML

Hybrid Test Environments Are the Most Popular

Hybrid test environments are the most popular testing environment (31%) followed closely by cloud-based solutions (29%). These two environments continue to beat out on-premise hardware, further validating the fact that hybrid and cloud-based testing is the way of the future.

WHICH TEST ENVIRONMENT DO YOU PRIMARILY USE?

- On-premise hardware
- Cloud-based solutions
- Other
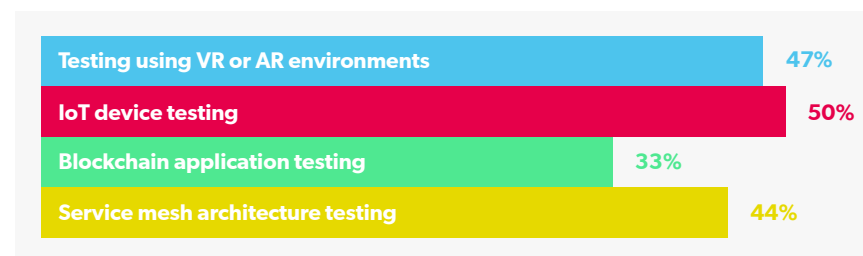- Virtual environments
- Hybrid

18% | 29% | 3% | 19% | 31%

Hybrid and cloud testing are growing in popularity due to their versatility, flexibility, and generally lower costs. Teams are increasingly looking for testing platforms that can support both hybrid and cloud environments. Perforce supports this growing popularity of hybrid and cloud testing, along with all forms of testing, including hybrid, cloud, and on-premise device testing. Regardless of your team's unique testing needs, Perforce's far-reaching support allows for comprehensive testing at scale in one intuitive and easy-to-navigate location.

Related Reading: [The Drawbacks of a DIY Mobile Device Lab Setup](#)

Teams Embracing New Testing Trends

The Internet of Things (IoT) is a trend that promises to continue gaining traction in 2024. Testing using virtual reality, blockchain application testing, and service mesh architecture testing are also growing in popularity.

ARE YOU CURRENTLY IMPLEMENTING OR CONSIDERING ANY OF THE FOLLOWING NEW TESTING APPROACHES? CHECK ALL THAT APPLY.

Testing using VR or AR environments	47%
IoT device testing	50%
Blockchain application testing	33%
Service mesh architecture testing	44%

IoT is a booming market and will need to be integrated into the continuous testing process. Continuous testing, or shift-left testing, helps ensure IoT devices remain functional. As IoT applications need to adapt frequently and rapidly to new requests, organizations will need to adopt technologies and processes to incorporate IoT device testing.
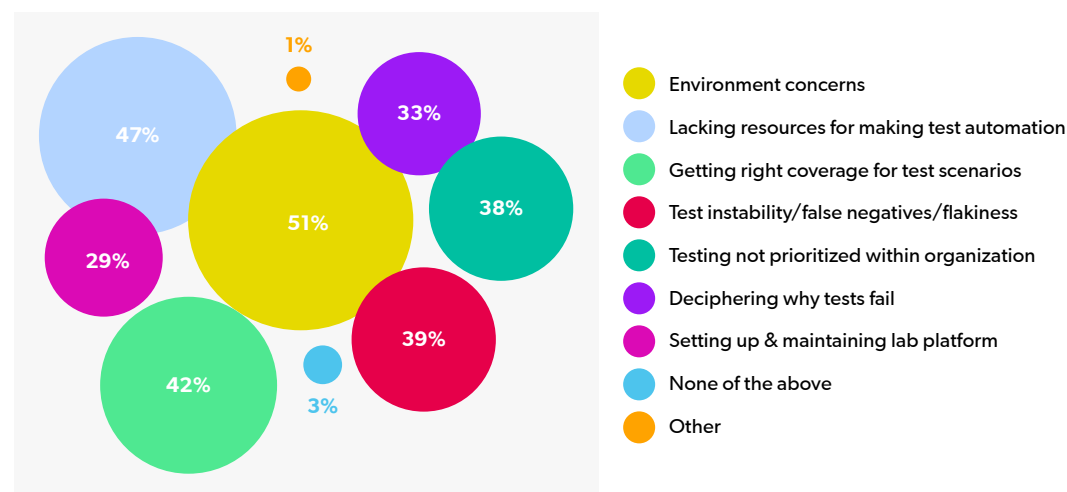
Our solution enhances IoT testing through its Jenkins plugin, a popular CI/CD tool, offering streamlined integration and automation capabilities.

Related Reading: [IoT Continuous Testing With Jenkins & BlazeMeter](#)

Lack of Automation Resources & Environment Concerns Challenges Teams Most

In 2024, the most frustrating challenge facing teams is environmental concerns, including test data, service virtualization, virtual devices, and more. Additionally, 47% of respondents indicated that lacking resources for creating test automation was a prominent pain point.

WHAT DO YOU FIND THE MOST CHALLENGING ABOUT TESTING? CHECK ALL THAT APPLY.

- 🟡 Environment concerns
- 🔵 Lacking resources for making test automation
- 🟢 Getting right coverage for test scenarios
- 🔴 Test instability/false negatives/flakiness
- 🟢 Testing not prioritized within organization
- 🟣 Deciphering why tests fail
- 🟣 Setting up & maintaining lab platform
- 🔵 None of the above
- 🟠 Other

Test environments, and acquiring usable and reliable test data, can be a frustrating bottleneck to the testing process. Traditional Service Virtualization applications can be time consuming and complex (not to mention costly) to set up, and mocks and stubs do not always account for real-world scenarios.

Mock Services directly address environmental concerns by creating on-demand Virtual Services in the CI/CD pipeline, eliminating dependencies, and simplifying test processes. Additionally, teams can benefit greatly from Mock Services solutions that are automated, deployable, and maintainable, as well as enable teams to solve their automation and environment issues in one intuitive platform.
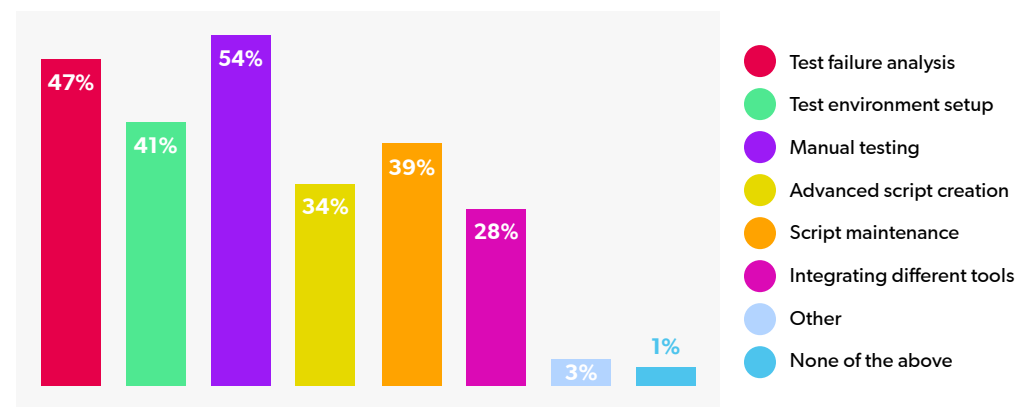
Related Reading: Above & Beyond: BlazeMeter Mock Services

47% of respondents indicated that lacking resources for creating test automation was a prominent pain point.

Test Failure Analysis Increasingly Time-Consuming

Test failure analysis continues to take up time and resources in 2024. Combined with manual testing, these areas of the software testing lifecycle are particularly tedious for testing teams.

WHAT IS THE MOST TIME-CONSUMING ACTIVITY FOR YOU WITHIN A TEST CYCLE?

Legend:
- Test failure analysis
- Test environment setup
- Manual testing
- Advanced script creation
- Script maintenance
- Integrating different tools
- Other
- None of the above

Bar values: 47%, 41%, 54%, 34%, 39%, 28%, 3%, 1%

There are four main reasons why tests fail:

1. Environment issues
2. Test issues
3. Issues with test data
4. Actual defects

Based on the data gathered by Perforce, barely 3% of failures are a result of actual defects. Yet defects are the most important failures to analyze when looking through testing reports. Organizations that do not have coordinated reporting methods ultimately spend more time and resources than necessary on backlogs.

Perforce's Testing Analytics and Reporting help teams find and resolve defects and failures in testing faster. With unified test reporting, you can quickly see all your test automation results in one location, identify issues faster with ML-powered detection and classification, and identify bugs earlier in the test cycle with root cause analysis. With advanced analytics and robust data, Perforce is able to help teams identify and resolve the 3% of failures resulting from actual defects more efficiently.

Additional features of Testing Analytics and Reporting include:

- Heatmaps
- Noise Filtering
- Visual Validation
- CI Dashboard
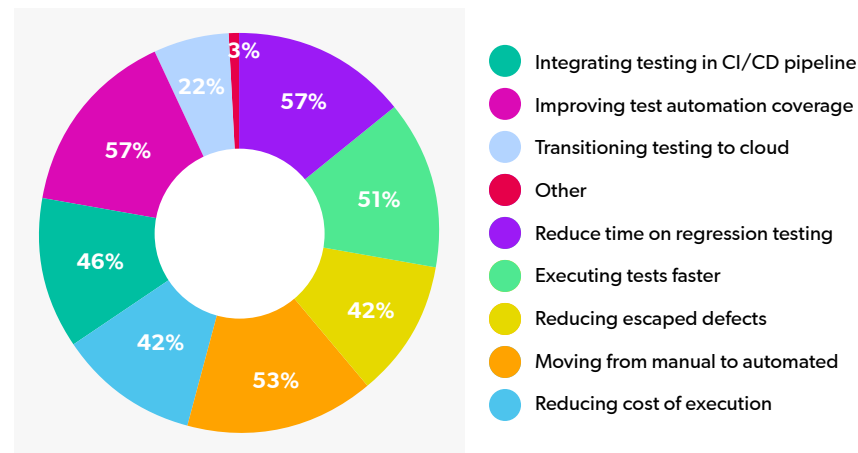- Rich Artifacts
- Root Cause Analysis
- And more

Related Reading: Test Automation Strategy for Beginners

> Perforce is able to help teams identify and resolve the **3%** of failures resulting from actual defects more efficiently.

Improving Test Coverage is a Continuous Testing Priority

Improving test automation coverage is one of the key aspects of a testing strategy that teams are focusing on in 2024. Making strategic decisions about test coverage based on users, their location, device trends, and a team's comfort with risk have come to the forefront of priorities for organizations.

WHICH IS YOUR TOP PRIORITY IN THE NEXT 6 TO 12 MONTHS? SELECT ALL THAT APPLY.

- 🟢 Integrating testing in CI/CD pipeline
- 🟣 Improving test automation coverage
- 🔵 Transitioning testing to cloud
- 🔴 Other
- 🟣 Reduce time on regression testing
- 🟢 Executing tests faster
- 🟡 Reducing escaped defects
- 🟠 Moving from manual to automated
- 🔵 Reducing cost of execution

Perforce significantly contributes to improving test automation coverage by offering expanded testing capabilities and insights into device and user trends. The Test Coverage Guide provides detailed information on the most popular devices by region, as well as insights into the latest device trends, market shifts, and new releases, helping you to ensure full test coverage for your team.
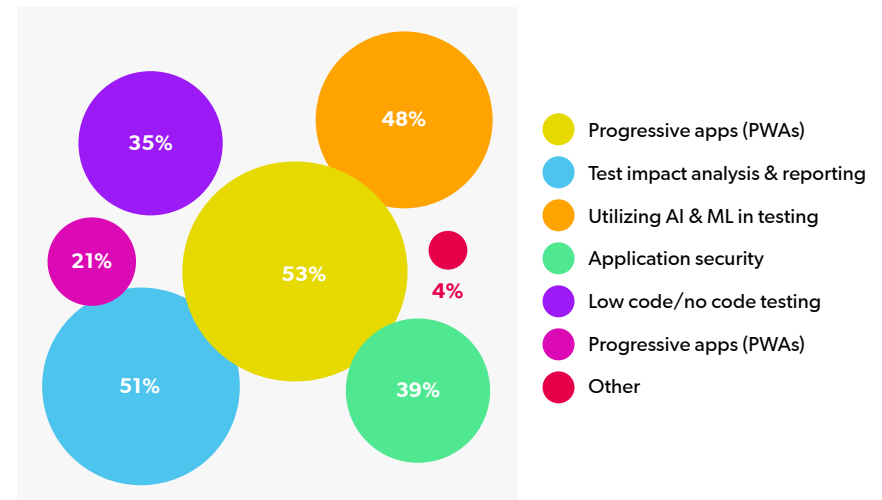
Inside you will find:

- **Expanded lists** of top 32 devices/OSs by country.
- **Practical tips** for applying the data to your test strategy.
- **Planning calendars** with upcoming mobile & web release dates.

Related Reading: Test Coverage Guide

Teams Investing More in Accessibility Testing

Accessibility testing is a major trend in 2024 for organizations looking to increase their user base and comply with regulatory requirements.

WHICH TRENDS IMPACTING TESTING ARE YOU LOOKING TO INVEST IN THIS YEAR? SELECT ALL THAT APPLY.

- 🟡 Progressive apps (PWAs)
- 🔵 Test impact analysis & reporting
- 🟠 Utilizing AI & ML in testing
- 🟢 Application security
- 🟣 Low code/no code testing
- 🟣 Progressive apps (PWAs)
- 🔴 Other

Accessibility testing ensures that applications are usable to as many people as possible, including individuals with visual, hearing, physical, or cognitive impairments.

The Web Content Accessibility Guidelines (WCAG), Section 508, and the Americans With Disabilities Act (ADA) help ensure that software is as accessible as possible to all users. Prioritizing A11Y accessibility not only helps teams meet legal requirements—and avoid potential fines of up to $150,000—but it also improves overall user experience for all users, not just those with disabilities.
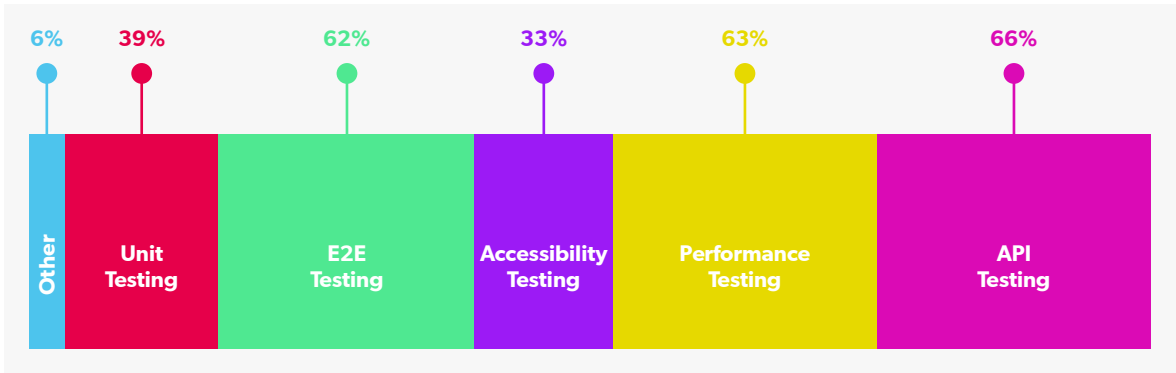
Perforce makes it easier than ever to incorporate accessibility testing into your testing strategy with Apple VoiceOver and Android TalkBack. This solution enables testers to test on devices in the cloud, gaining an advantage over competitors. Furthermore, teams can eliminate dependency on having physical devices in hand and increase automation, scalability, and speed.

Related Reading: A11Y Accessibility Testing Trends

Teams Continuing to Focus on Non-Functional Testing

2024 will see organizations seeking to expand automation testing with more of their non-functional testing capabilities by focusing on API, performance, and E2E testing.

WHICH TEST AUTOMATION TYPES ARE YOUR MAIN FOCUS AREA IN 2024? SELECT ALL THAT APPLY.

Other	Unit Testing	E2E Testing	Accessibility Testing	Performance Testing	API Testing
6%	39%	62%	33%	63%	66%

Perforce makes it easier than ever to incorporate accessibility testing.

Non-functional testing remains highly important for teams hoping to shift their testing left. Incorporating non-functional testing such as performance testing and load testing is critical to an organization's success.
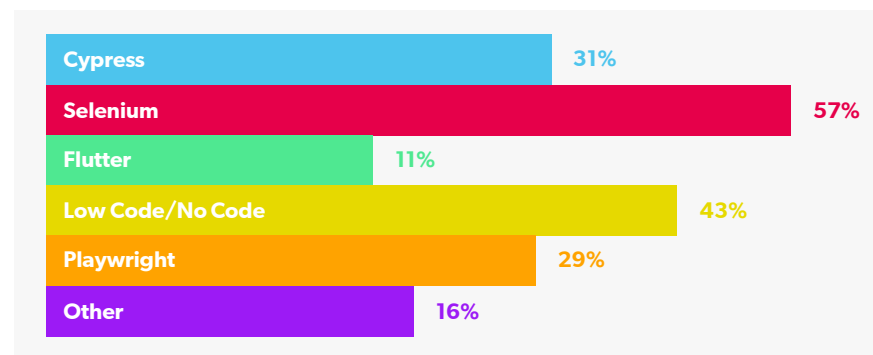
Load Testing allows teams to run massively scalable, open source-based performance tests against applications, including web and mobile apps and APIs. In addition, API Testing and Monitoring lets teams know how their APIs are behaving so they can address issues quickly and efficiently. Service Virtualization (Mock Services) and Test Data further enable teams to incorporate non-functional testing capabilities into their testing suite.

Related Reading: Performance Testing vs. Load Testing vs. Stress Testing

Teams Embracing Low-Code/ No-Code/Scriptless Solutions in 2024

Low-code and no-code/scriptless solutions are seeing an increase in popularity. Organizations are investing in tools that can be used by their entire team regardless of coding skillset. As indicated in section 6 of this report, manual testing was found by 54% of respondents to be the most time-consuming portion of the testing process. No-code/scriptless testing significantly speeds up the testing process, which is why 43% of respondents plan to utilize scriptless testing in 2024.

WHICH FRAMEWORKS DO YOU PLAN TO USE IN 2024? SELECT ALL THAT APPLY.

Framework	Percentage
Cypress	31%
Selenium	57%
Flutter	11%
Low Code/No Code	43%
Playwright	29%
Other	16%

Traditionally, making the transition from manual mobile testing to automated mobile testing has not always been easy—until now. Scriptless Mobile helps teams automate the most complex native mobile use cases through simplified, rapid test creation with as many test combinations as you need to boost your testing efficacy. In addition, Scriptless Mobile helps eliminate dependency on coding and frees up time to focus on business goals and their application.

Related Reading: Bell Mobility Transforms Application Testing With Perfecto Scriptless Mobile

Scriptless testing offers the same powerful capabilities as more traditional frameworks while also making automation accessible to teams of any skill level. Selenium (57%) remains the most popular testing framework in 2024. Another aspect of the data to note is that the next two most popular open-source frameworks of respondents are Cypress (31%) and Playwright (29%).

Related Reading: Cypress vs. Selenium: What's the Right Cross-Browser Testing Solution for You?

A Year In Review and What's to Come in 2024

This past year saw the growth of many new testing trends. As we look beyond 2024, Perforce's continuous testing suite will continue to lead in innovation, offering cutting-edge solutions tailored to evolving testing needs and trends.

EMBRACING ADVANCES IN TESTING TECHNOLOGY

As new technologies like AI and ML continue to take hold of the testing landscape, teams will continue to look for ways to implement them into their testing strategies. Teams are already recognizing the importance of embracing AI and ML into their testing pipeline but have not yet made the leap to implementation. Going forward, it will be important for teams to adopt platforms that are in step with new technologies and that are finding innovative ways to stay ahead of the curve.

LACK OF TEST AUTOMATION RESOURCES & ENVIRONMENT CONCERNS STILL MAJOR CHALLENGE

A lack of automation resources, test environments, and acquiring reliable test data continue to be roadblocks to testing teams in 2024. Organizations will need to find solutions that address all these concerns while eliminating dependencies. Mock Services, which are automated, deployable, and maintainable, will help teams solve their automation and environmental issues while providing reliable and usable test data that allows for the testing of real-world scenarios.

PRIORITIZING ACCESSIBILITY TESTING

With regulatory requirements in place and the risk of fines—and with user experience remaining a necessity for successful applications—teams are continuing to prioritize and invest in accessibility testing. Not only does accessibility testing reduce the risk of legal repercussions, but it also increases the user base when more individuals can access your applications.

Incorporating accessibility testing into your testing strategy with new technologies such as Apple VoiceOver and Android TalkBack enables teams to increase automation, scalability, and speed—all while doing the right thing for their users.

BlazeMeter University offers a wide range of testing courses, from beginner to advanced framework lessons—including Perfecto courses—so you can continuously improve your testing and advance your skills. For testing teams and software developers, the continuous advancement of knowledge is a crucial step in staying up to speed with current testing trends.

We encourage you to take advantage of our free resources, including our courses, signing up for a free trial of our platforms, or discovering how to boost productivity while saving on cost and reducing risk with the ROI Calculator.

YOUR PLATFORM FOR COMPLETE CONTINUOUS TESTING

With Perforce, achieving application quality has never been easier. Perforce's comprehensive suite—Perfecto and BlazeMeter—provides a single source for delivering sharper market focus, faster releases, greater speed to market, reduced costs, and improved quality. Maximize continuous testing and shift quality left by requesting a custom demo or start testing today at perfecto.io and blazemeter.com.